

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-290239

(43)Date of publication of application : 11.11.1997

---

(51)Int.Cl. B09B 3/00  
C05F 9/02  
C05F 17/00

---

(21)Application number : 08-092274 (71)Applicant : JAPAN STEEL WORKS  
LTD:THE

(22)Date of filing : 15.04.1996 (72)Inventor : NAGAI TATSUO  
OTANI TAKASHI  
FUKUSHIMA KENJI  
HATTORI KIMIHARU  
ONO AKIO  
YOKOTA MASAKAZU

---

(30)Priority

Priority number : 08 41507 Priority date : 28.02.1996 Priority country : JP

---

## (54) MICROBIOLOGICAL TREATMENT OF ORGANIC MATERIAL

### (57)Abstract:

PROBLEM TO BE SOLVED: To efficiently conduct the microbiological treatment of an org. material having a cellulosic cell by crushing the cellulosic cell before the treatment.

SOLUTION: The shell of an org. material having a cellulosic shell is crushed prior to the microbiological treatment. The grain such as rice and wheat having a shell, the beans such as a peanut having a shell and the vegetable material such as watermelon and a persimmon having a shell are exemplified among the vegetable org. waste. Any treatment capable of decomposing the org. material can be applied as the microbiological treatment, and composting, volume reduction, methane fermentation, etc., are exemplified. Although any means capable of sufficiently crushing the cellulosic shell can be used, the extrusion of the org. matter by an extruder, for example, is preferable from the standpoint of convenience and throughput per unit time.

---

### LEGAL STATUS

[Date of request for examination] 29.09.1998

[Date of sending the examiner's decision of 03.04.2001  
rejection]

[Kind of final disposal of application other  
than the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against  
examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2000 Japan Patent Office

\* NOTICES \*

**Japan Patent Office is not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**CLAIMS**

---

[Claim]

[Claim 1] The microorganism-treatment technique of the nature material of organic characterized by crushing the husks of the concerned quality of a cellulose before a microorganism treatment in the microorganism treatment of the nature material of organic which has the husks of the quality of a cellulose.

[Claim 2] The microorganism-treatment technique of the claim 1 publication which is that to which spallation of the husks of the quality of a cellulose is performed by extruding with an extruder the nature material of organic which has the husks of the quality of a cellulose.

[Claim 3] The claim 1 whose microorganism treatment is fermentation processing, or the microorganism-treatment technique given in two.

---

[Translation done.]

\* NOTICES \*

**Japan Patent Office is not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**TECHNICAL FIELD**

---

[The technical field to which invention belongs] this invention relates to the microorganism-treatment technique of the nature material useful to a production of the full ripeness compost in a short period of time, or a completion of a methane fermentation of organic.

---

[Translation done.]

**\* NOTICES \***

Japan Patent Office is not responsible for any  
damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**PRIOR ART**

---

[Prior art] The methane fermentation which is processing using the microorganism, for example, compost-izing and aversion-processing which are good mind-processing, as processing of the organic nature eccrisis is put in practical use. Usually, when compost--ization-processing the organic nature eccrisis, carrying out using moisture adjustment material, performing xeransis processing, etc., and adjusting moisture to 65 - 70% about the high eccrisis of a water content, has presented the microorganism treatment conventionally [ of a certain thing ] only by performing pretreatments, such as elimination or dehydration of a foreign matter, about almost all raw materials regardless of the modality of organic nature eccrisis which is a raw material.

[0003] However, it is decomposed into the decomposition of the quality of organic which the microorganism which exists in the nature performs by the quality of organic, and there is a difference in it easy. For example, although a carbohydrate like boiled rice and the protein like meat are easy to disassemble, the quality of a cellulose, such as a tree, a peanut, and husks of wheat, is hard to be decomposed. In order to solve this, a processing term is lengthened in order to decompose the quality of organic which is hard to be decomposed in the microorganism treatment of the nature material of organic which has the husks of the quality of a cellulose, such as the semen, conventionally, or what is easy to be decomposed is mixed and the device of making decomposition accelerate etc. is made.

---

[Translation done.]

**\* NOTICES \***

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**TECHNICAL PROBLEM**

---

[Object of the Invention] However, in long-period-of-time, for example, a compost, -izing, processing of the quality of organic seldom decomposed by microorganisms, such as quality of a cellulose, takes for six months to one year, therefore there is a trouble where processors, such as a fermenter, become large. moreover, qualitatively of organic which has the husks of the quality of a cellulose which is hard to be decomposed like a peanut or wheat Although the quality of organic which is easy to be decomposed into husks exists, since husks are not disassembled, decomposition does not progress collectively after all. do not become a compost (full ripeness product) or It has started for a long period of time until loss-in-quantity-ization of a compost etc. is completed, in order for disassembly of husks to take a long period of time, though it is not carried out or husks are disassembled so that an energy recovery may consider. Therefore, the purpose of this invention is to offer the efficient microorganism-treatment technique of the nature material of organic of having the husks of the quality of a cellulose.

---

[Translation done.]

## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## MEANS

---

[The means for solving a technical problem] Then, as a result of examining many things that the above-mentioned technical problem should be solved, when crushing the husks of the nature material of organic which has the husks of the quality of a cellulose before a microorganism treatment, a carbohydrate, protein, etc. which are shut up in husks can contact now with a microorganism, decomposition was started from the early stages of a microorganism treatment, and this invention persons find out that decomposition is completed for a short period of time, and came to complete this invention.

[0006] That is, the fermentation art of the nature material of organic characterized by this invention crushing the husks of the concerned quality of a cellulose before a microorganism treatment in the microorganism treatment of the nature material of organic which has the husks of the quality of a cellulose is offered.

[0007]

[Gestalt of implementation of invention] The vegetable material which has the husks of the bean which has the husks of the cereals which have the husks of rice, wheat, etc. among vegetable organic nature ecclisis, a peanut, etc. as a nature material of organic which has the husks of the quality of a cellulose used for this invention, a watermelon, a persimmon, etc. is mentioned.

[0008] Although it will not be limited especially if the microorganism treatment of the nature material of organic in this invention is processing (fermentation processing of a wide sense) into which the nature material of organic is made to decompose by the microorganism, compost-ized processing, \*\*\*\*-ized processing, a methane fermentation, etc. are mentioned.

[0009] The microorganism-treatment technique of this invention has the characteristic feature in crushing the husks of the nature material of organic which has the husks of the quality of a cellulose in advance of a microorganism treatment. It is desirable to perform it by extruding the nature material of organic with an extruder, for example, although it will not be restricted especially if spallation processing in this invention is the means which can fully crush the husks of the quality of a cellulose from the viewpoint of the throughput per simple nature and unit time. As an extruder, one shaft or biaxial are sufficient.

[0010] The husks of the quality of a cellulose are crushed and the quality of organic into which the carbohydrate shut up in husks and protein are easy to disassemble will be mixed with husks by the material extruded from one shaft or the biaxial extruder in this way. If it supplies to a fermenter in the status, the quality of organic which is easy to be decomposed can contact now with a microorganism, and as a result, quickly, decomposition will continue and will come to be performed.

[0011] After a spallation processing end of the aforementioned husks should just give a material to a usual microorganism treatment. For example, what is necessary is in compost-izing, to supply a material to a fermenter, and just to carry out natural fermentation of the 55 degrees C or more so that it may become desirable in temperature of 60 degrees C or more.

---

[Translation done.]

## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

#### DETAILED DESCRIPTION

---

## [Detailed description]

[0001]

[The technical field to which invention belongs] this invention relates to the microorganism-treatment technique of the nature material useful to a production of the full ripeness compost in a short period of time, or a completion of a methane fermentation of organic.

[0002]

[Prior art] The methane fermentation which is processing using the microorganism, for example, compost-izing and aversion-processing which are good mind-processing, as processing of the organic nature eccrisis is put in practical use. Usually, when compost--ization-processing the organic nature eccrisis, carrying out using moisture adjustment material, performing xeransis processing, etc., and adjusting moisture to 65 - 70% about the high eccrisis of a water content, has presented the microorganism treatment conventionally [ of a certain thing ] only by performing pretreatments, such as elimination or dehydration of a foreign matter, about almost all raw materials regardless of the modality of organic nature eccrisis which is a raw material.

[0003] However, it is decomposed into the decomposition of the quality of organic which the microorganism which exists in the nature performs by the quality of organic, and there is a difference in it easy. For example, although a carbohydrate like boiled rice and the protein like meat are easy to disassemble, the quality of a cellulose, such as a tree, a peanut, and husks of wheat, is hard to be decomposed. In order to solve this, a processing term is lengthened in order to decompose the quality of organic which is hard to be decomposed in the microorganism treatment of the nature material of organic which has the husks of the quality of a cellulose, such as the semen, conventionally, or what is easy to be decomposed is mixed and the device of making decomposition accelerate etc. is made.

[0004]

[Object of the Invention] However, in long-period-of-time, for example, a compost,-izing, processing of the quality of organic seldom decomposed by microorganisms, such as quality of a cellulose, takes for six months to one year, therefore there is a trouble where processors, such as a fermenter, become large. moreover, qualitatively of organic which has the husks of the quality of a cellulose which is hard to be decomposed like a peanut or wheat Although the quality of organic which is easy to be decomposed into husks exists, since husks are not disassembled, decomposition does not progress collectively after all. do not become a compost (full ripeness product) or It has started for a long period of time until loss-in-quantity-ization of a compost etc. is completed, in order for disassembly of husks to take a long period of time, though it is not carried out or husks are disassembled so that an energy recovery may consider. Therefore, the purpose of this invention is to offer the efficient microorganism-treatment technique of the nature material of organic of having the husks of the quality of a cellulose.

[0005]

[The means for solving a technical problem] Then, as a result of examining many things that the above-mentioned technical problem should be solved, when crushing the husks of the nature material of organic which has the husks of the quality of a cellulose before a microorganism treatment, a carbohydrate, protein, etc. which are shut up in husks can contact now with a microorganism, decomposition was started from the early stages of a microorganism treatment, and

this invention persons find out that decomposition is completed for a short period of time, and came to complete this invention.

[0006] That is, the fermentation art of the nature material of organic characterized by this invention crushing the husks of the concerned quality of a cellulose before a microorganism treatment in the microorganism treatment of the nature material of organic which has the husks of the quality of a cellulose is offered.

[0007]

[Gestalt of implementation of invention] The vegetable material which has the husks of the bean which has the husks of the cereals which have the husks of rice, wheat, etc. among vegetable organic nature ecclisis, a peanut, etc. as a nature material of organic which has the husks of the quality of a cellulose used for this invention, a watermelon, a persimmon, etc. is mentioned.

[0008] Although it will not be limited especially if the microorganism treatment of the nature material of organic in this invention is processing (fermentation processing of a wide sense) into which the nature material of organic is made to decompose by the microorganism, compost-ized processing, \*\*\*\*-ized processing, a methane fermentation, etc. are mentioned.

[0009] The microorganism-treatment technique of this invention has the characteristic feature in crushing the husks of the nature material of organic which has the husks of the quality of a cellulose in advance of a microorganism treatment. It is desirable to perform it by extruding the nature material of organic with an extruder, for example, although it will not be restricted especially if spallation processing in this invention is the means which can fully crush the husks of the quality of a cellulose from the viewpoint of the throughput per simple nature and unit time. As an extruder, one shaft or biaxial are sufficient.

[0010] The husks of the quality of a cellulose are crushed and the quality of organic into which the carbohydrate shut up in husks and protein are easy to disassemble will be mixed with husks by the material extruded from one shaft or the biaxial extruder in this way. If it supplies to a fermenter in the status, the quality of organic which is easy to be decomposed can contact now with a microorganism, and as a result, quickly, decomposition will continue and will come to be performed.

[0011] After a spallation processing end of the aforementioned husks should just give a material to a usual microorganism treatment. For example, what is necessary is in compost-izing, to supply a material to a fermenter, and just to carry out natural fermentation of the 55 degrees C or more so that it may become desirable in temperature of 60 degrees C or more.

[0012]

[Example] Next, an example is given, and although this invention is explained still in detail, thereby, this invention is not restricted at all.

[0013] The iris diaphragm dregs of barley tea were extruded with the processing speed of 180kg/o'clock using the biaxial extruder with 52mm [ of the diameters of example 1 screw ], and a screw length of about 1m. About 700kg of this material is supplied to a scoop formula fermenter, and it was made to ferment, stirring by one - two frequencies/day performing aeration. Although transition of the material temperature in this fermentation processing was shown in drawing 1 , material temperature exceeds 60 degrees C and fermentation in a pyrosphere 60 degrees C or more was performed [ more than ] continuously after that on the 20th on the 3 day of a fermenter injection. Although transition of an organic part cracking severity was shown in drawing 2 </A>, since it reached and it reached to about 70% about 60% in the 30th day on the 20 day of processing, fermentation processing was ended .

[0014] Processing by example of comparison 1 extruder was not performed, but the iris diaphragm dregs of barley tea were fermented like the example 1 except [ the ] supplying to a fermenter again. Transition of the material temperature at this time is shown in drawing 3 , and transition of an organic part cracking severity is shown in drawing 4 . Consequently, by the time material temperature became 60 degrees C, five months was required, by the time the organic part cracking severity reached to 60%, five months was required, and the organic part cracking severity did not reach to 70% after six months.

[0015] The iris diaphragm dregs of barley tea were extruded with the processing speed of 180kg/o'clock using the biaxial extruder with 52mm [ of the diameters of example 2 screw ], and a

screw length of about 1m. Batch processing of about 700kg of this material was supplied and carried out to the methane-fermentation equipment which is aversion-processing. The total amount of the gas which occurred by processing for 30 days judged to have ended processing mostly was 3 140m. [0016] Processing by example of comparison 2 extruder was not performed, but it fermented like the example 2 except feeding the iris diaphragm dregs of barley tea into methane-fermentation equipment as it is. The gas total yield by the 3,150th of the gas total yield from processing start to the 30th was 3 120m 30m.

[0017]

[Effect of the invention] According to the microorganism-treatment technique of the nature material of organic of this invention, the decomposition of the nature material of organic which is not decomposed by the microorganism but has the husks of the quality of a \*\*\*\* cellulose can be made to be able to complete for a short period of time, and the purposes, such as loss-in-quantity-izing and an energy recovery, can be attained. Since a microorganism treatment serves as a short time, since processing assistant \*\* becomes still unnecessary, the size of a special biological treatment equipment becomes small.

---

[Translation done.]

## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

**EXAMPLE**


---

[Example] Next, an example is given, and although this invention is explained still in detail, thereby, this invention is not restricted at all.

[0013] The iris diaphragm dregs of barley tea were extruded with the processing speed of 180kg/o'clock using the biaxial extruder with 52mm [ of the diameters of example 1 screw ], and a screw length of about 1m. About 700kg of this material is supplied to a scoop formula fermenter, and it was made to ferment, stirring by one - two frequencies/day performing aeration. Although transition of the material temperature in this fermentation processing was shown in drawing 1 , material temperature exceeds 60 degrees C and fermentation in a pyrosphere 60 degrees C or more was performed [ more than ] continuously after that on the 20th on the 3 day of a fermenter injection. Although transition of an organic part cracking severity was shown in drawing 2 , since it reached and it reached to about 70% about 60% in the 30th day on the 20 day of processing, fermentation processing was ended.

[0014] Processing by example of comparison 1 extruder was not performed, but the iris diaphragm dregs of barley tea were fermented like the example 1 except [ the ] supplying to a fermenter again. Transition of the material temperature at this time is shown in drawing 3 , and transition of an organic part cracking severity is shown in drawing 4 . Consequently, by the time material temperature became 60 degrees C, five months was required, by the time the organic part cracking severity reached to 60%, five months was required, and the organic part cracking severity did not reach to 70% after six months.

[0015] The iris diaphragm dregs of barley tea were extruded with the processing speed of 180kg/o'clock using the biaxial extruder with 52mm [ of the diameters of example 2 screw ], and a screw length of about 1m. Batch processing of about 700kg of this material was supplied and carried out to the methane-fermentation equipment which is aversion-processing. The total amount of the gas which occurred by processing for 30 days judged to have ended processing mostly was 3 140m.

[0016] Processing by example of comparison 2 extruder was not performed, but it fermented like the example 2 except feeding the iris diaphragm dregs of barley tea into methane-fermentation equipment as it is. The gas total yield by the 3,150th of the gas total yield from processing start to the 30th was 3 120m 30m.

---

[Translation done.]

\* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

DESCRIPTION OF DRAWINGS

---

[An easy explanation of a drawing]

[ Drawing 1 ] It is drawing showing the relation of the number of fermentation processing dates and material temperature in an example 1.

[ Drawing 2 ] It is drawing showing the relation of the number of fermentation processing dates and the organic part cracking severity in an example 1.

[ Drawing 3 ] It is drawing showing the relation of the number of the fermentation processing moons and material temperature in the example 1 of a comparison.

[ Drawing 4 ] It is drawing showing the relation of the number of the fermentation processing moons and the organic part cracking severity in the example 1 of a comparison.

---

[Translation done.]

## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

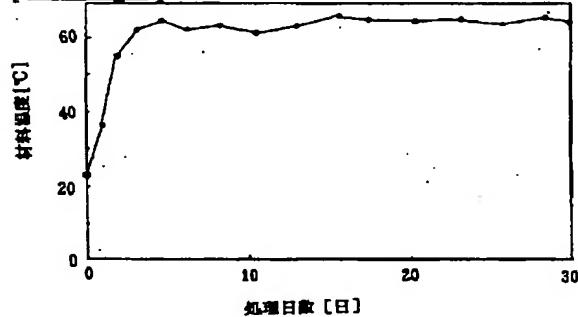
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

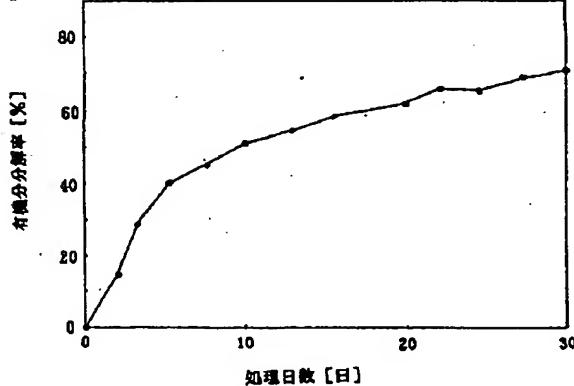
DRAWINGS

---

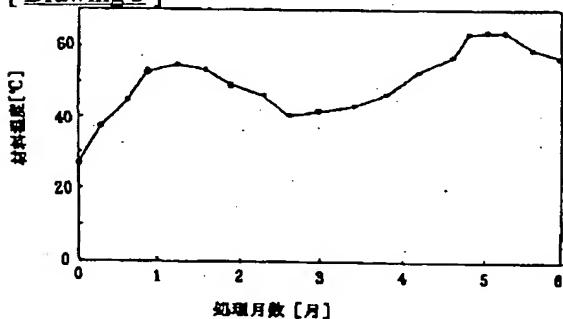
[ Drawing 1 ]



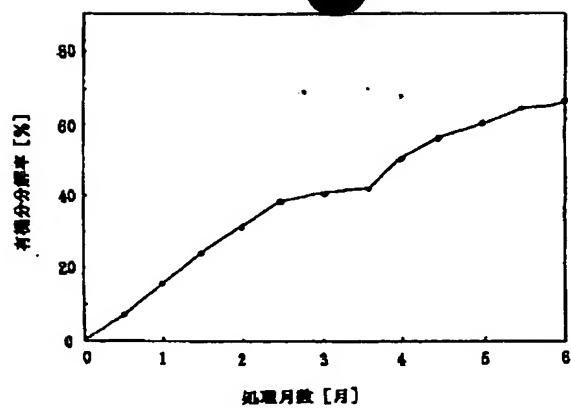
[ Drawing 2 ]



[ Drawing 3 ]



[ Drawing 4 ]



---

[Translation done.]

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.